One-on-ONE

Interview with Kerenor Dental Studio

Interview of Haim Keren, MDT, CDT, founder

by Wolfgang Friebauer, MDT, CDT

interview of

Haim Keren

Haim Keren, MDT, CDT, is the founder of Kerenor Dental Studio, a high-end dental laboratory located in Montreal, Canada, that delivers world-class restorations with premium esthetics and function. As an expert in zirconia restorations, Haim has contributed to the development of both the technology and methodology utilized in fabricating zirconia for the dental industry. Read on for some exclusive technical pointers on how to guarantee success in your monolithic zirconia restorations.



First of all, thank you for taking the time to do this. To start us off, tell us a little bit about your laboratory location and your lab services.

We are located in downtown Montreal. It's both a big city and a very small city. Montreal is an island; you have to use a bridge to get to the city. We are in a corner of downtown in a high-end area. Our core customers are here. We started with those high-end people — prosthodontists — and we built a business from that.

How many years ago was that?

This location is 12 years old.

All together, how long have you been in the dental business?

I'm second-generation; I was born in the business. I was working in my father's lab by the time I was 15. I went to dental school for three years, and by that time I had already been working at my father's lab in Israel. Now I'm 45.

Do you remember when you started using zirconia as a restorative material?

We started with zirconia at the end of 2006. Before that, most of my lab production was aluminum oxide, like In-Ceram® (Vident; Brea,



Calif.). We did most of the crowns and bridges with aluminum oxide, because I once took a course with VITA in the late '90s and was introduced to In-Ceram. I didn't want to do any more PFMs; I thought I could do almost everything with aluminum oxide, so I really took it to the limit. I took it to the point where VITA scientists told me I could not show the results, because other people would not be able to understand what they were looking at.

When I would go to the International Dental Show every two years, zirconia was always there, but the machines were too big and the material was too white. Later, they came out with Lava™ (3M™ ESPE™; St. Paul, Minn.) and other systems, but I was never convinced to go with zirconia because all of the restrictions with design and the margin just didn't make any sense to me. I was getting a much better marginal fit with aluminum oxide (I used to use the refractory technique), and zirconia never made any sense to me. I never did any pressed ceramic because the aluminum oxide gave me all the esthetics that I needed. I came to a point where I felt like I was getting to my limits in terms of structure, support, and a variety of other things. One day, my father called me and said, "You have to look at this guy in Italy." So I called Enrico Steger and I went to Italy. He was in a basement under the laboratory that was upstairs. And that's when I saw this machine. This is the first time I understood it, because I realized I had to think three-dimensionally to put it into the block. It was a whole new world.

That wasn't Enrico's pantograph-type milling machine, was it?

Yes, it was the pantograph. They forgot I was supposed to be visiting. The guy who was supposed to give the course said, "OK, I guess I'll have to give him a course." On the first day the machine was not producing the desired results. So I came back the next day and said, "I'm going to have to make it work." I looked at it, and with all of my knowledge in milling, telescopic crowns, attachments, and all of those things, I placed the objects and just started. I said, "I will go for it." I felt that I could make something out of it. I felt that I could teach myself and do something with it.

So, was that the spirit that helped you become the leading champion for zirconia restorations?

I came back to Montreal and told my two-and-a-half clients that I was not going to do any more aluminum oxide or metal on the big structures (I was using metal in some implant screw-retained cases). I said, "That's it. This is not my market. I'm going to concentrate on zirconia." I understood that the milling machine was only as good as I am, and that the limits were in my hands and not in the machine. It gave me a huge advantage with all of the CAD/CAM out there, and this time, I could control the process. All of my knowledge of aluminum oxide structures, connectors and design was useable with zirconia. I slowly began to improve the product with the failures, though there weren't so many.

Do you remember the year when you started that?

It was 2007.

That's quite a few years ago. Do you remember when you tried the first solid zirconia restorations or the first full-mouth implant-supported prostheses?

The first case was 10 units. The machine had just three axes, so I couldn't reach inside the crowns because of the angle. I had to glue the block on top of the machine to gain extra angles. I had made a commitment to myself to make everything in zirconia, meaning I had to solve any situation. In the middle of 2007, we got this case where a lady wanted her restorations to be as white as they could be. She was from Florida and wanted them to be brighter than any of her neighbors'. I said to myself, "What could be brighter than a block of zirconia?"

Right!

It was a lot of work, but I finished the case. Looking back, it was a benchmark for me for a lot of things. We had to deal with a lot of vertical height, and the blocks back then were not big enough. So I had to come up with a solution: I had to make a double-structure screw-retained restoration. It's the first time something like that



had ever been done. We did the second part screw-retained, and on the first part all the occlusion was monolithic. I didn't see any problems, I could polish it and I managed to make the glaze thick enough to look nice and shiny.

What was the response of your doctor, the response of the patient?

Oh, the patient was ecstatic. And I'm very lucky. My main prosthodontist, Sylvio Caro, is upstairs in my building. When I came back from Italy, I showed him a bridge — just the framework — and I said, "Sylvio, this is what we are going to do now." The next day, he came down with a hammer and the bridge in his hand and said, "I can't break it. It dug into my bench and I can't break it. It's unbelievable!" I was very, very happy then. I have curious clients that like innovation. They trust me and know that whatever I'm going to make is for the best. Whenever I give them a product, they don't ask about what's inside. They know I'm going to use the best materials with the best technology, because we cannot afford to remake a case. We have to do it the right way the first time. I was very lucky that Dr. Caro told me that I could do whatever I wanted and just see where it goes.

How have things changed since you first started working with zirconia?

When I first started using it, photographing it, writing articles on it, everything would be changed by the time I finished the articles. So at a certain point, I stopped writing articles because by the time they were published, I had changed my technique. It moved very fast, because everything we learned we learned in the lab. There were (and are) no books on how to do a zirconia structure correctly. We had to take all of our knowledge of structural engineering and designing and judge every step taken. Every time a batch came from the oven, we would analyze it. We would analyze the liquids every time as well, and realized how many variables were involved with those. They were not that consistent. Somewhat like porcelain from a bottle, there is a certain up-and-down in the value. On the consistency of the blocks, we learned that if we had to do an upper and a lower, we had to use the same batch. We had to place them in the ovens for the same amount of time and use a support. All of these cases during the day were essentially both R&D and real cases at the same time.

So is it right to say that technicians like you made that material actually work?

I made it work so that I could use it. I made it work as a curiosity. Of course, I wanted to make a living, but my drive was curiosity, my drive was to get the ultimate product. I want to use one material in my lab. I don't want to have to hide the material. I want to build it up in a way that will last. That was the goal, to make something that would last.

You've shown and talked about your masterpieces all over the world. Did that help grow your laboratory?

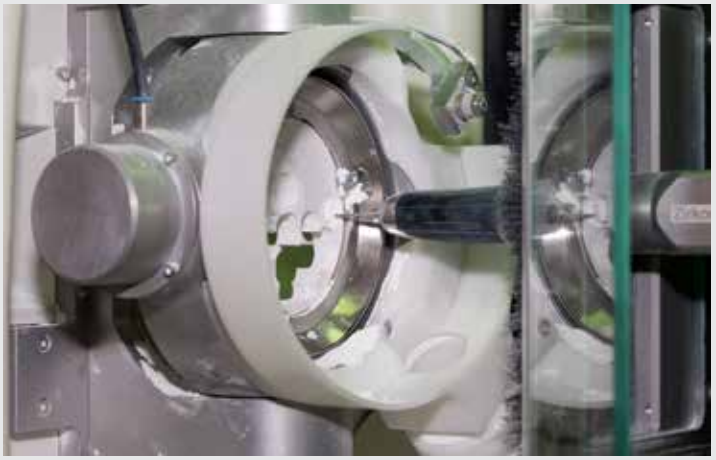
We get a lot of recognition. We get to do a lot of cases around the world, and our work even went into space; we made a case for a client a couple of years ago, and it went into space with him.

That's amazing!

I've met amazing, amazing clinicians. I am only as good as my clients. Because of my clients and the caliber of my clients, I'm able to be good. They are the drive for the quality, the consistency and the mechanics involved in the whole production of a restoration. Being on a team with all of those professionals around the world is what made the product happen, what got zirconia to the level it is at now.

What do you think about the digital impression wave? Do you work with digital impressions, and are you running into any challenges there?

It's the piece that's going to complete my circle. We talk about how we're in the digital environment, but we're still in analog with the models. Once we get that covered, we can say that we have a real digital workflow.





In the last five years, it's really started to move, but there's a catch: because the quality of the models isn't quite there, even those who bought the scanners haven't made everything virtually. No average-sized lab took it upon itself to get a printer or a milling machine to make those models, so I felt that if I didn't give the technology a push, it wasn't going to gain traction in Canada. We investigated what would be the ideal printer for us — what technology of printing, what type of material — and we made a commitment. We invested in a printer without having any commitments from any client with a scanner. I was surprised, as soon as we got a printer there was a huge interest from our clients. Dentists heard we had a printer, and they said, "Now that you have a printer, I should get a scanner." I did my research to know what the best was for my standards — best for me in accuracy, best for me in communication — and I made the first move to show that I am confident in the technology. I built all of this without having any market. Like in zirconia, I created the market myself.

A reverse technique. Good.

If I were to take $150,000 today and buy full-page ads instead of buying $150,000 worth of high-tech equipment, the ads wouldn't bring me more business at this time. But I don't count how many models I have to make to justify this machine. Even if it got me only one more client, I would get this machine. Right now, it's just important for me to really understand the technology and see how I can improve it. It's very exciting. We're very fortunate as a small-sized lab to be able to take something like this and spend so many man-hours analyzing it, and saying, "I like it this way," and, "I like it that way. Let's do it."

Speaking of the digital side, what is your percentage of full-zirconia restorations versus other types of restorations?

We haven't done any metal crowns since the day we started with zirconia. We never went back to PFMs or any other types of restorations. Today, 95 percent of our restorations are monolithic crowns and bridges, and the other five percent are full-arch cases where we're veneering the gingiva on it. With the new generation of zirconia, it's unbelievable; it's so alive that it looks like ceramic. It really looks and behaves like ceramic. It's strong, though currently there are some issues with how thin you can go.

You are definitely the roundhouse, full-arch specialist. Thinking back, how many of those roundhouse restorations have you done in full zirconia so far?

We are coming close to 300.

Wow, that's a lot. How do they compare to your smaller restorations? Are they a bigger part of your lab work?

Our lab is modeled after what the customers want. We have a core of customers in our area that make up about 50 percent of our business, and then the other 50 percent is the specialty part of the lab, which are those big cases that come from all over North America. The customers reserve a spot and we tell them when we can do a case. We have a lot of cases where others tried and failed. When nobody else can do a case, it comes to us. When a big case goes wrong, or when something is unusual, it comes to us. Fifty percent of our business is unique, customized cases, big bridges, or even sections.

With your reputation, it doesn't surprise me. Can you share a few secrets you've discovered while working with zirconia and full-contour restorations? Are there some do's and don'ts you can share with us?

I think the most important thing is to respect the material. If you don't respect the material, it's going to come back and bite you. There are absolutely no shortcuts with zirconia, especially with monolithic restorations. Monolithic has made me a better technician because the anatomy, the function, everything, has to be established before the crown is actually made. It makes you better because you have to look at every angle, angles that you have never looked at before. In the past, you were always able to add ceramic, but when you do a monolithic crown, it has to be as clean as possible so that you have the form and function. For function, you don't want to grind on it or do all kinds of modifica-





tions. And monolithic zirconia is technically collapsing under its own weight. With three units or more, I always put in a support, and I always sinter it upright. It's a successful formula to not have any distortions in the frame. Also, you have to give it a lot of time in the oven; there's no shortcut when it comes to glazing the structures. I would never take a bridge out of the oven before it reached 300 degrees Celsius. You have to have a slow rate of heating and cooling. This is crucial for success. You could make the most beautiful bridge, but if you don't respect the cycle in the oven when glazing or baking, it's going to come back to haunt you.

And we all have seen that happen.

Exactly. You must respect the heat rate. Zirconia is a very bad heat conductor, so you have to introduce the heat slowly and let it come out of the structure slowly. You have to analyze every step on a daily basis and calibrate your equipment on a weekly or biweekly schedule, because even today you can have different values from batch to batch. Everything has to be top-notch; there's no room for error.

We cannot add to the margin, so I never run my tools for longer than 50 percent of their rated lifespan. I know it's a luxury, but I find that I would rather lose the tools than a structure or a bridge or even a crown. With digital technology, you can really set high standards. You can see how long you run the machines, how long and at what speeds you run the tools, and how you use your sintering ovens. Taking all the information you can really creates an exact formula, which is something you couldn't do before.

Where do you envision your laboratory a few years from now?

For the last two years, we've been holding the business back because we didn't want to get overwhelmed — we were working at 200 percent capacity already — but it was still very important for us to invest in new technologies such as oral scanning. We've put a lot of manpower into that now, and it's coming soon. With oral scanners, I believe our business will be able to reach anywhere that there is a demand for a high-end, high-quality product. So this will definitely increase our business. Now, we are increasing the profitability of the lab; we are doubling in size. We will be able to train more people. The employees are the next big investment we are going to make. When we have a bigger space, we are going to train people, treat them right, and pay them right, so they can be an asset to the company.

When you say doubling in size, may I ask how large you are now?

We are around 700 square feet.

So doubling up is a lot. You'll end up with 1,400–1,500 square feet.

We are going to be at least 1,500 square feet. It's amazing the amount of work we are able to manufacture in such a small space. If it weren't for monolithic, there would be no way we could make this volume. With monolithic restorations, they go into the sintering oven at night and come out in the morning. So essentially, there's round-the-clock work being done. With monolithic, it's a win-win for the dentist because it's a nearly indestructible structure, and for the lab, because it's a crown that you can put into a formula that comes out consistently.

I think it's a win-win for the patient as well. They definitely benefit.

Of course.

Where do you see zirconia 10 years from now?

Oh, it's certainly not going to be what it is now. I would say that over the last three years, zirconia has been where porcelain was in the '70s, where we had one dentin and maybe one enamel type. There are a lot of advantages with the new generation of materials that are coming out, but we are still definitely going to have to use different types of blocks for different types of restorations. Unfortunately, we can't have one master material for every type of restoration.



So you see different types?

When you're talking about a more complex restoration, we'll be using at least two to three types of zirconia to complete a restoration: For an abutment, it's one kind; the structure, another kind; and if you want an esthetic anterior, it's another kind still.

Esthetic-wise, with the new generation that we're running in the lab right now, it looks better than lithium disilicate. It's a very warm color. It's in the cream zone. There's no grayness, no whiteness. It's a huge advantage, especially if it's a minimum-prep reduction. The material really takes the color of the prep. If I make an A2 and it's a minimally reduced prep, you'll see a nice gradual color come through. The root area would be around an A3 because it absorbs the color of the prep. It's a big advantage. But on the other hand, if the tooth is discolored, you have to use another material. When looking at the color of your prep, you should be able to determine what type of material can be used to compensate for the color.

If you had one sentence to describe zirconia oxide, what would it be?

I would say, 'The future is already here — it's just not very evenly distributed."

You've said some very valuable things. What do you and your wife, Julie, do together that you find stimulating?

We are fortunate that we are in business together. She has her part of the business and I have mine, and that's how we make it so successful. When we come home, we don't have to talk about work because we did everything together during the day, so there's no need to explain anything. We take breaks together, and we go to the gym and to Pilates, and then we go back to work. We do a lot of traveling. Julie writes the articles and does the presentations. Julie's really the face and the front of the lab. Every day, we take it as it comes.

It sounds like you have a lot of little hobbies that you enjoy.

We love to ski. We love to garden together. We love to have a good bottle of wine. We're collecting wine and art. Between wine and art, we have a lot in common. Montreal is a beautiful city. It's a very alive city. You can eat and drink here 24 hours a day. Yesterday when we finished at the lab, we went out to sit and have dinner at 11:00 p.m.

That's great! Is there anything else you would like to say about your laboratory, or laboratories in general?

The lab format as we know it, I don't see how it can exist in the future. I don't see a one-person lab buying a porcelain oven and a handpiece and making a living anymore. Today, with technology, you need a technician and you need a software engineer that can understand and run your equipment. There is going to have to be collaboration between a technician and an engineer to make the dental business work in the near future. The whole industry is changing the perception of what a dental lab is. I see that we are heading for great changes. LP